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(54) Mixer

(57) A mixer e.g. for cement, has a rotatable drum (11) which has a base portion (17), a neck portion (20) spaced forwardly of the base portion and having an aperture through which the drum may be filled or emptied, and a collapsible tubular wall portion (22) extending between the base and neck portions. The neck portion can be moved to a position adjacent the base portion to collapse the tubular wall portion, for storage of the mixer when not in use. The tubular wall portion may be flexible or telescopic. The neck portion is normally mounted in front of the base portion by removable struts or foldable arms.

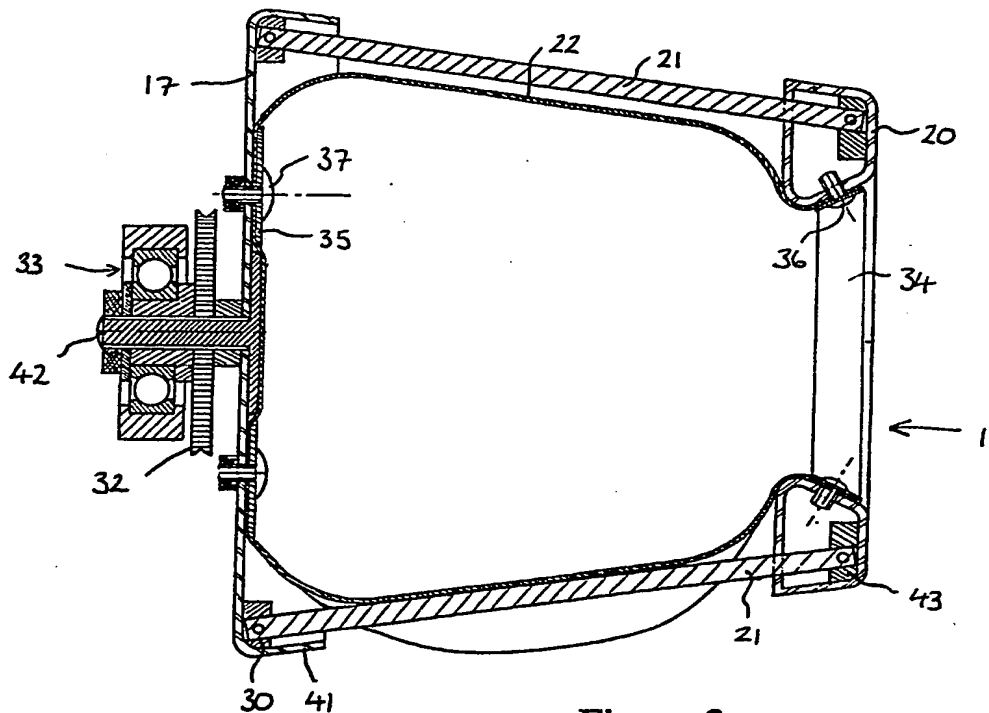


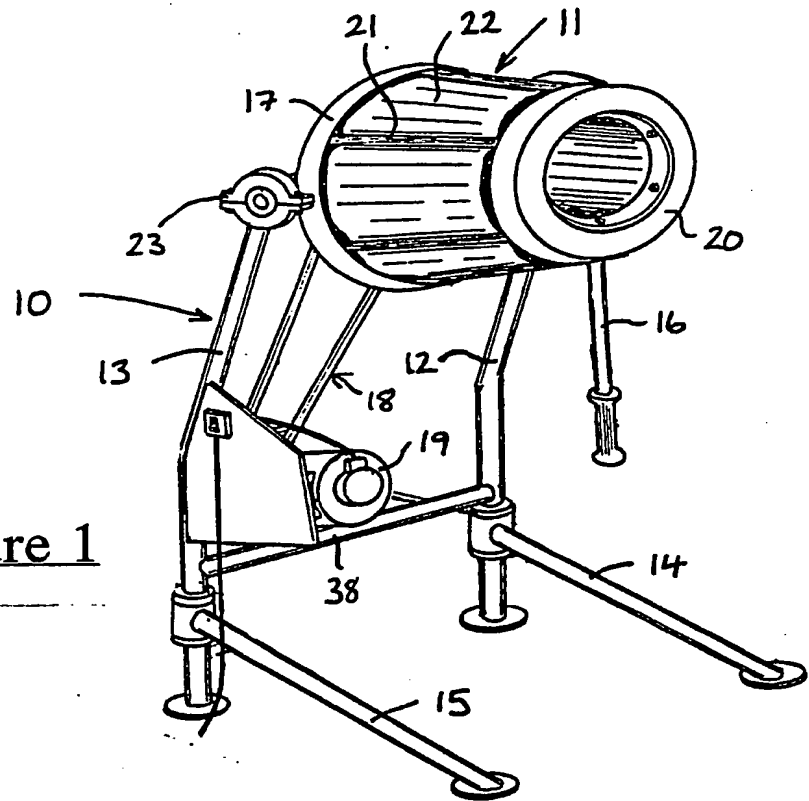
Figure 2

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

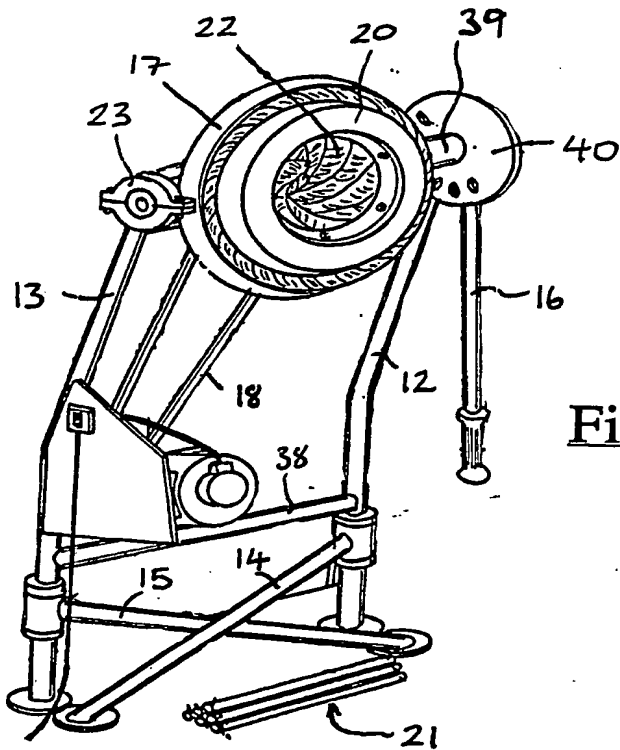
This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

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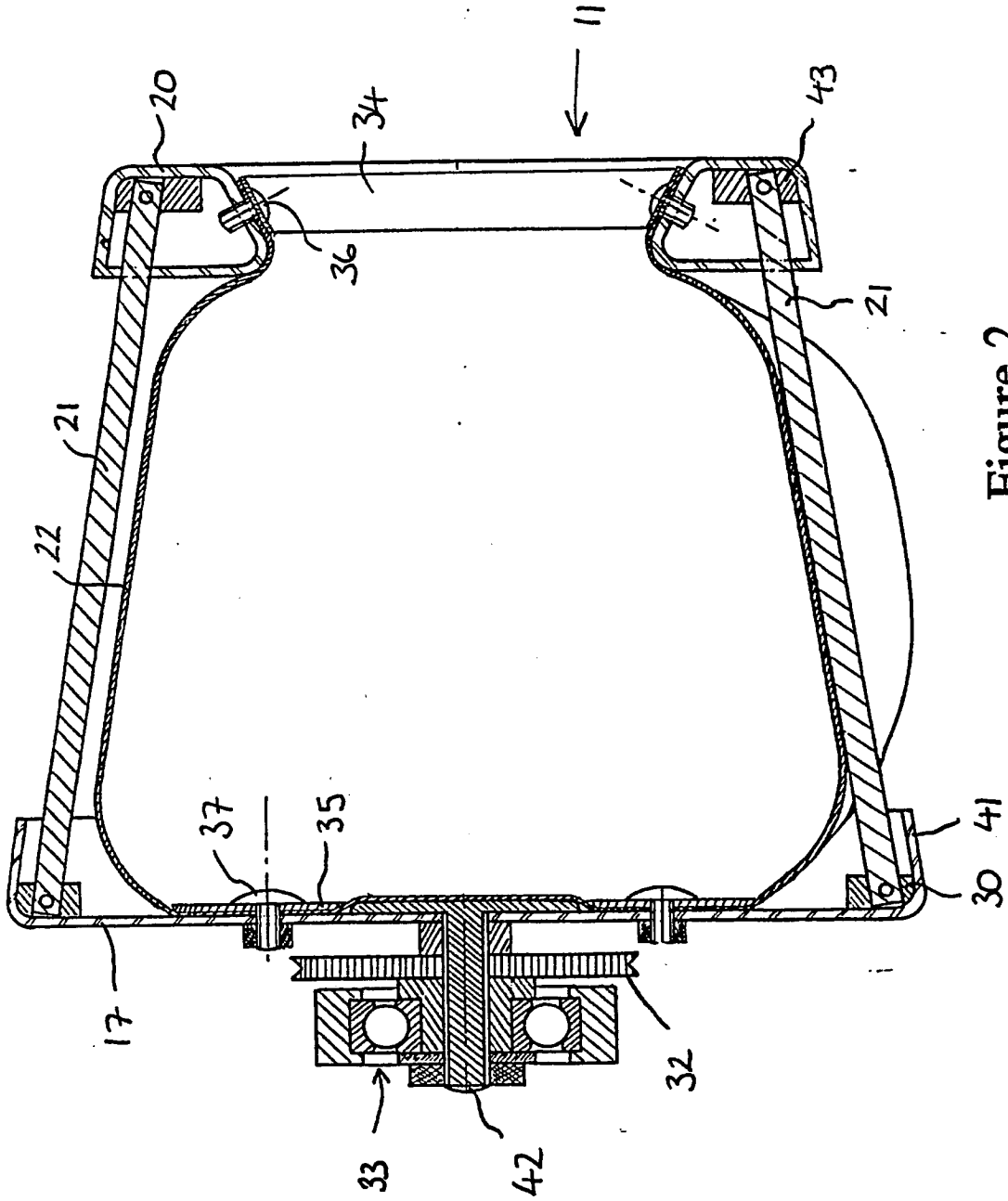
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**Figure 1**



**Figure 5**

**Figure 2**

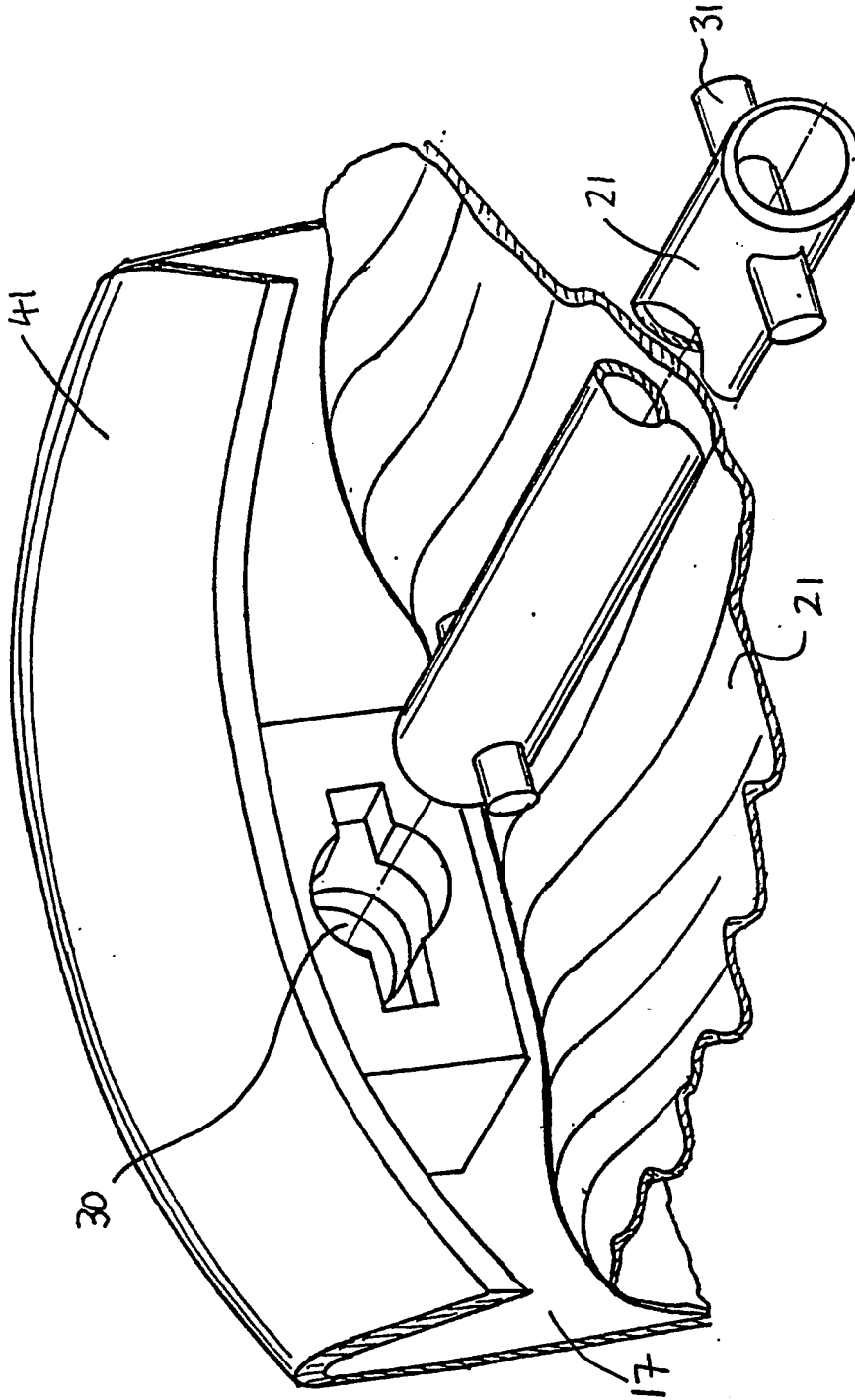


Figure 3

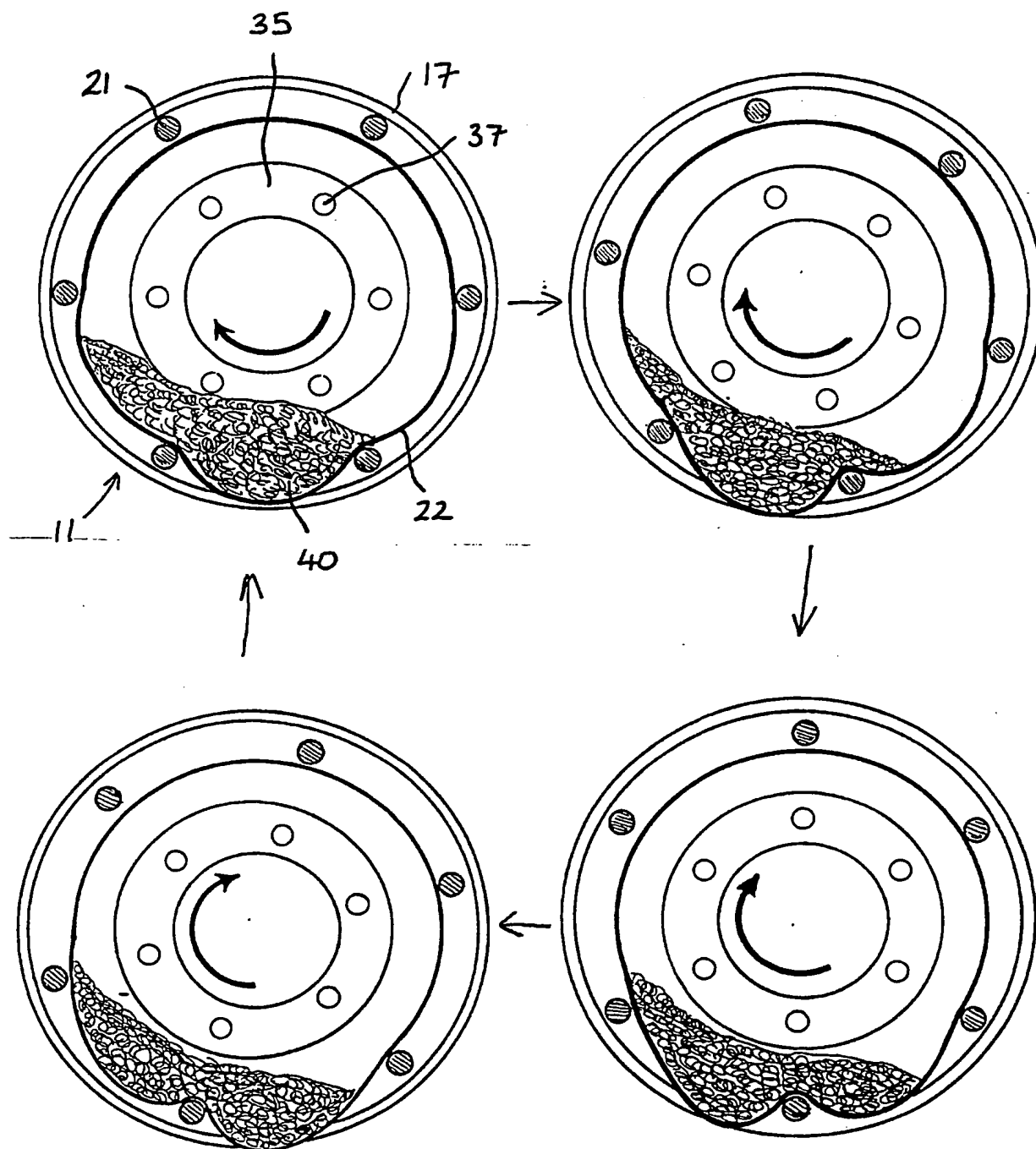


Figure 4

- 1 -

Mixer

This invention relates to a mixer, and particularly but not solely to a cement mixer.

Conventional cement mixers comprise a metal drum rotatably mounted to a support structure. The interior of the drum is provided with a plurality of vanes which agitate the mixture inside the drum as it is rotated. A problem with conventional mixers is that their drums are cumbersome and difficult to clean. Some mixers have been proposed which can be folded down when not in use: however although the support structure-folds down, the drum still occupies considerable space.

I have now devised a mixer which alleviates these problems, and in particular can be folded down to occupy very little space when not in use.

In accordance with this invention, there is provided a mixer having a rotatable drum for receiving material to be mixed, the drum comprising a base portion, a neck portion normally spaced forwardly of said base portion and having an aperture through which the drum may be filled or emptied, and a collapsible tubular wall portion extending between said base and neck portions, the neck portion being movable to a position adjacent the base portion to collapse the tubular wall portion.

When the mixer is not in use, the neck portion of the drum can be moved to its position adjacent the base portion, the tubular wall portion collapsing to allow this.

Preferably the neck portion of the drum is normally mounted in front of the base portions by support members which extend between said portions. These support members preferably comprise removable elongate struts having opposite ends which engage with the base and neck portions respectively. Alternatively the support members may comprise foldable arms or other types of collapsible linkages.

Preferably these support members are spaced apart around the axis of rotation of the drum.

Preferably the collapsible tubular wall portion lies radially inwardly of the support members of the drum.

The collapsible tubular wall portion may comprise a

telescopic tube. Preferably the collapsible tubular wall portion comprises a flexible tube. The flexible nature of the drum wall makes it easier to clean.

The flexible tubular wall preferably comprises a bag-shaped liner having a closed bottom and an open neck. Preferably the bottom of the liner is attached to the base portion of the drum. The neck of the liner is preferably attached around the aperture in the neck portion of the drum. Preferably the liner can be detached from the drum.

10 An embodiment of this invention will now be described by way of example only and with reference to the accompanying drawings, in which:

FIGURE 1 is a perspective view of a cement mixer in accordance with this invention;

15 FIGURE 2 is a sectional view through the drum of the mixer of Figure 1;

FIGURE 3 is a perspective view of a portion of the drum of the mixer of Figure 1;

FIGURE 4 is a schematic diagram to illustrate the operation of the mixer of Figure 1; and

20 FIGURE 5 is a perspective view of the mixer of Figure 1 when dismantled.

Referring to Figure 1 of the drawings, there is shown a cement mixer comprising a drum 11 rotatably mounted on a support frame 10. The frame comprises a pair of parallel uprights 12,13 connected by a cross-bar 38, and legs 14,15 which are hinged to the lower ends of respective uprights 12,13, so that in use they can be hinged forwardly to act as cantilever supports for the uprights 12,13. A motor 19 is mounted to the frame 10 with its output shaft (not shown) projecting rearwardly.

30 A support shaft 39 for the drum 11 is mounted for rotation about a horizontal axis by bearings e.g. 23 fixed to the upper ends of the uprights 12,13. A handle 16 extends radially outwards from the support shaft 39 for rotating the latter about its axis. A disc 40 is mounted co-axially to the support shaft 39 and is provided with a plurality of apertures spaced around its circumference: these apertures index with a

projection on the upright 12 in order to hold the support shaft 39 in selected angular position.

Referring to Figures 2 and 3, the drum 11 is rotatably mounted to the support shaft 39 by a bearing 33, so that the axis of the drum extends perpendicular to the axis of the support shaft 39. The drum 11 comprises a circular base-plate 17 having a forwardly projecting flange 41 around its periphery. A mounting spindle 42 for the drum projects rearwardly from the centre of the base-plate 17. A plurality of sockets 30 are spaced-apart around the periphery base-plate 17 and are arranged to receive the ends of elongate tubular struts 21. The struts 21 have laterally projecting pins e.g. 31 extending through their ends, so that an end of each strut 21 can be engaged by twist-fitting into a socket 30 of the base-plate 17. An annular face-plate 20 is provided with similar sockets 43 for receiving the opposite ends of the struts 21 in a similar manner. The struts rigidly support the face-plate 20 at a predetermined distance in front of the base-plate 17, to form a cage-like structure. A bag-shaped liner 22 is fitted inside this cage, and an annular plate 35 holds the bottom portion of the liner 22 to the base-plate 17, the plate 35 being fixed by bolts 37 which extend through apertures in the bottom of the liner 22. The neck of the liner 22 is fitted to the annular face-plate 20 by an annular band 34 which is fixed by bolts 36 to the face-plate 20.

A drive belt 18 connects a drive pulley on the output shaft of motor to a pulley 32 mounted on the spindle 42 of the drum.

In use, the drum 11 is positioned with its axis extending generally horizontally as shown in Figure 1, so that sand, cement and water can be loaded into the drum 11. The motor 19 is energised to rotate the drum 11 about its axis. Referring to Figure 4, the weight of the mix 40 inside the drum causes the liner 22 to sag under the influence of gravity between adjacent struts 21. As the drum 11 rotates the mix 14 remains in the lower portion of the drum 11, thereby causing the sag in the liner 22 to move progressively around the drum



11. As the mix moves from one sag to the next it is lifted and folded over the intervening strut 22: this action serves to thoroughly mix the sand, cement and water. It will be appreciated that the need for conventional mixing vanes is  
5 avoided.

The disc 40 can be disconnected from the upright 12, in order that the support shaft 39 can be rotated to empty the drum 11.

Referring to Figure 5, the mixer may be folded down for  
10 storage. The struts 21 can be removed and then the drum 11 can be folded flat, and the legs 14,15 are hinged inwardly. It will therefore be seen that the mixer can be folded in a neat and compact manner when not in use.

The liner will require changing at intervals but this  
15 is easy to accomplish. Generally the liner is easy to clean because of its flexible nature, but in the case of some mixes which are difficult to remove, it is an easy matter to change the liner.

Claims

- 1) A mixer having a rotatable drum for receiving material to be mixed, the drum comprising a base portion, a neck portion normally spaced forwardly of said base portion and having an  
5 aperture through which the drum may be filled or emptied, and a collapsible tubular wall portion extending between said base and neck portions, the neck portion being movable to a position adjacent the base portion to collapse the tubular wall portion.
- 2) A mixer as claimed in claim 1, comprising support  
10 members extending between said neck portion and said base portion of the drum, to mount said neck portion in front of the base portion.
- 3) A mixer as claimed in claim 2, in which said support members comprise removable elongate struts having opposite ends  
15 which engage with said neck and base portions respectively.
- 4) A mixer as claimed in claim 2, in which said support members comprise collapsible linkages.
- 5) A mixer as claimed in any one of claims 2 to 4, in which said support members are spaced apart around the axis of  
20 rotation of the drum.
- 6) A mixer as claimed in any one of claims 2 to 5, in which said collapsible tubular wall portion lies radially inwardly of said support members.
- 7) A mixer as claimed in any preceding claim, in which  
25 said collapsible tubular wall portion comprises a flexible tube.
- 8) A mixer as claimed in claim 7, in which said flexible tube comprises a bag-shaped liner having a closed bottom and an open neck.

- 9) A mixer as claimed in claim 8, in which the bottom of said liner is attached to the base portion of the drum.
- 10) A mixer as claimed in claim 8 or 9, in which the neck of the liner is attached around the neck portion of the drum.
- 5 11) A mixer as claimed in any one of claims 8 to 10, in which the liner is detachable from the drum.
- 12) A mixer substantially as herein described with reference to the accompanying drawings.

<b>Patents Act 1977</b> <b>Examiner's report to the Comptroller under Section 17</b> <b>(The Search report)</b>	<b>Application number</b> <b>GB 9301175.7</b>
<b>Relevant Technical Fields</b>  (i) UK Cl (Ed.M)    B1C (CAM CAT) (ii) Int Cl (Ed.5)    B01F; B28C	<b>Search Examiner</b> <b>R E SHOEFIELD</b>
<b>Databases (see below)</b> (i) UK Patent Office collections of GB, EP, WO and US patent specifications.  (ii) ONLINE DATABASES: WPI	<b>Date of completion of Search</b> <b>4 FEBRUARY 1994</b>  <b>Documents considered relevant following a search in respect of Claims :-</b> <b>1-12</b>

**Categories of documents**

<b>X:</b>	Document indicating lack of novelty or of inventive step.	<b>P:</b>	Document published on or after the declared priority date but before the filing date of the present application.
<b>Y:</b>	Document indicating lack of inventive step if combined with one or more other documents of the same category.	<b>E:</b>	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
<b>A:</b>	Document indicating technological background and/or state of the art.	<b>&amp;:</b>	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2208154 A (WEBB)	
A	GB 1099958 (RIEDEL ET AL)	

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